

What is claimed is:

1. A method for determining a bit rate need of a plurality of variable rate video channels in a video encoder, comprising the steps of:

processing video data from a current picture in each respective channel to determine at least a spatial activity and a temporal activity thereof; and

determining a bit rate demand D_i for each current picture according to the associated spatial activity and temporal activity.

2. The method of claim 1, comprising the further step of:

adjusting said bit rate demand D_i for each current picture according to whether at least one of a scene change, fade and flash is detected for the current picture.

3. The method of claim 1, comprising the further step of:

increasing the associated temporal activity of each current picture if the associated spatial activity is below a lower threshold; and

adjusting said bit rate demand D_i for each current picture according to said increasing step.

4. The method of claim 1, comprising at least one of the further steps of:

increasing said bit rate demand D_i for each current picture when the associated temporal activity exceeds an upper threshold; and

decreasing said bit rate demand D_i for each current picture when the associated temporal activity is less than a lower threshold.

5. The method of claim 1, comprising the further step of:

determining a quantization level of at least one previous picture for each current picture; and

increasing said bit rate demand D_i for each current picture when the quantization level of the at least one previous picture exceeds an upper threshold.

6. The method of claim 1, wherein each current picture is part of an associated group of pictures, comprising at least one of the further steps of:

decreasing said bit rate demand D_i for each current picture when a length of the associated group of pictures exceeds a nominal level; and

increasing said bit rate demand D_i for each current picture when a length of the associated group of pictures is less than a nominal level.

7. The method of claim 6, comprising the further steps of:

reducing or eliminating the increase or decrease of said increasing and decreasing steps,

respectively, when the temporal activity of each current picture exceeds an upper threshold.

8. The method of claim 1, comprising the further step of:

adjusting said bit rate demand D_i for each current picture according to a horizontal pixel resolution thereof.

9. The method of claim 1, comprising the further steps of:

determining a brightness level for each current picture; and

increasing said bit rate demand D_i for each current picture when the associated brightness level is less than a lower threshold.

10. The method of claim 1, comprising the further step of:

adjusting said bit rate demand D_i for each current picture according to a priority factor thereof which indicates a relative importance of each current picture in said multiplexed data stream.

11. The method of claim 1, comprising the further steps of:

determining an overall available bit rate for transmitting the current pictures in a multiplexed data stream;

determining an allocated bit rate for each current picture according to a ratio of bit rate demand of each current picture and a sum of the bit rate demands from each current picture; and

providing the allocated bit rate for each current picture to respective video data compressors for compressing the respective current pictures to obtain compressed video data for transmission in said multiplexed data stream.

12. The method of claim 11, wherein said allocated bit rate for each current picture is determined in a plurality of iterations including an initial iteration and at least one successive iteration, comprising the further steps of:

determining a bit rate surplus or deficit between the overall available bit rate and a sum of the allocated bit rates for each current picture in the initial iteration; and

allocating the surplus or deficit among at least some of the current pictures according to a ratio of bit rate demand of said at least some of the current pictures and a sum of the bit rate demands [of said at least some of the current pictures in the at least one successive iteration.

13. An apparatus for determining a bit rate need of a plurality of variable rate video channels in a video encoder, comprising:

means for processing video data from a current picture in each respective channel to determine at

least a spatial activity and a temporal activity thereof; and

means for determining a bit rate demand D_1 for each current picture according to the associated spatial activity and temporal activity.

14. The apparatus of claim 13, further comprising:

means for adjusting said bit rate demand D_1 for each current picture according to whether at least one of a scene change, fade and flash is detected for the current picture.

15. The apparatus of claim 13, further comprising:

means for increasing the associated temporal activity of each current picture if the associated spatial activity is below a lower threshold; and

means for adjusting said bit rate demand D_1 for each current picture according to said increasing means.

16. The apparatus of claim 13, further comprising at least one of:

means for increasing said bit rate demand D_1 for each current picture when the associated temporal activity exceeds an upper threshold; and

means for decreasing said bit rate demand D_1 for each current picture when the associated temporal activity is less than a lower threshold.

17. The apparatus of claim 13, further comprising:

means for determining a quantization level of at least one previous picture for each current picture; and

means for increasing said bit rate demand D_i for each current picture when the quantization level of the at least one previous picture exceeds an upper threshold.

18. The apparatus of claim 13, wherein each current picture is part of an associated group of pictures, further comprising:

means for decreasing said bit rate demand D_i for each current picture when a length of the associated group of pictures exceeds a nominal level; and

means for increasing said bit rate demand D_i for each current picture when a length of the associated group of pictures is less than a nominal level.

19. The apparatus of claim 18, further comprising:

means for reducing or eliminating the increase or decrease of said increasing and decreasing means, respectively, when the temporal activity of each current picture exceeds an upper threshold.

20. The apparatus of claim 13, further comprising:

means for adjusting said bit rate demand D_i for each current picture according to a horizontal pixel resolution thereof.

21. The apparatus of claim 13, further comprising:

means for determining a brightness level for each current picture; and

means for increasing said bit rate demand D_i for each current picture when the associated brightness level is less than a lower threshold.

22. The apparatus of claim 13, further comprising:

means for adjusting said bit rate demand D_i for each current picture according to a priority factor thereof which indicates a relative importance of each current picture in said multiplexed data stream.

23. The apparatus of claim 13, further comprising:

means for determining an overall available bit rate for transmitting the current pictures in a multiplexed data stream;

means for determining an allocated bit rate for each current picture according to a ratio of bit rate demand of each current picture and a sum of the bit rate demands from each current picture; and

means for providing the allocated bit rate for each current picture to respective video data compressors for compressing the respective current pictures to obtain compressed video data for transmission in said multiplexed data stream.

24. The apparatus of claim 23, wherein said allocated bit rate for each current picture is determined in a plurality of iterations including an initial iteration and at least one successive iteration, further comprising:

means for determining a bit rate surplus or deficit between the overall available bit rate and a sum of the allocated bit rates for each current picture in the initial iteration; and

means for allocating the surplus or deficit among at least some of the current pictures according to a ratio of bit rate demand of said at least some of the current pictures and a sum of the bit rate demands of said at least some of the current pictures in the at least one successive iteration.